Supplementary Information for

Resource limitation modulates the fate of dissimilated nitrogen in a dual-pathway Actinobacterium

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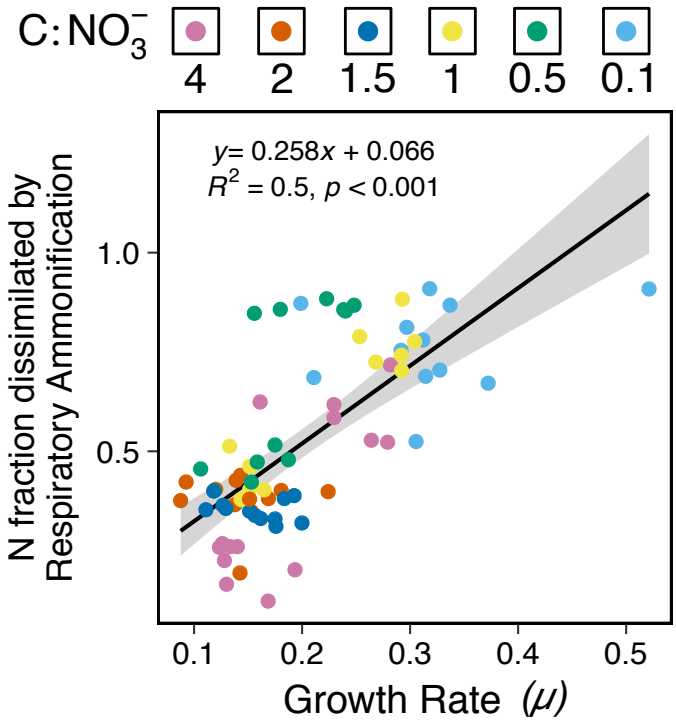

Figure S1. Relationship between growth rate and the fraction of N dissimilated by respiratory ammonification for high and low nutrient concentrations.

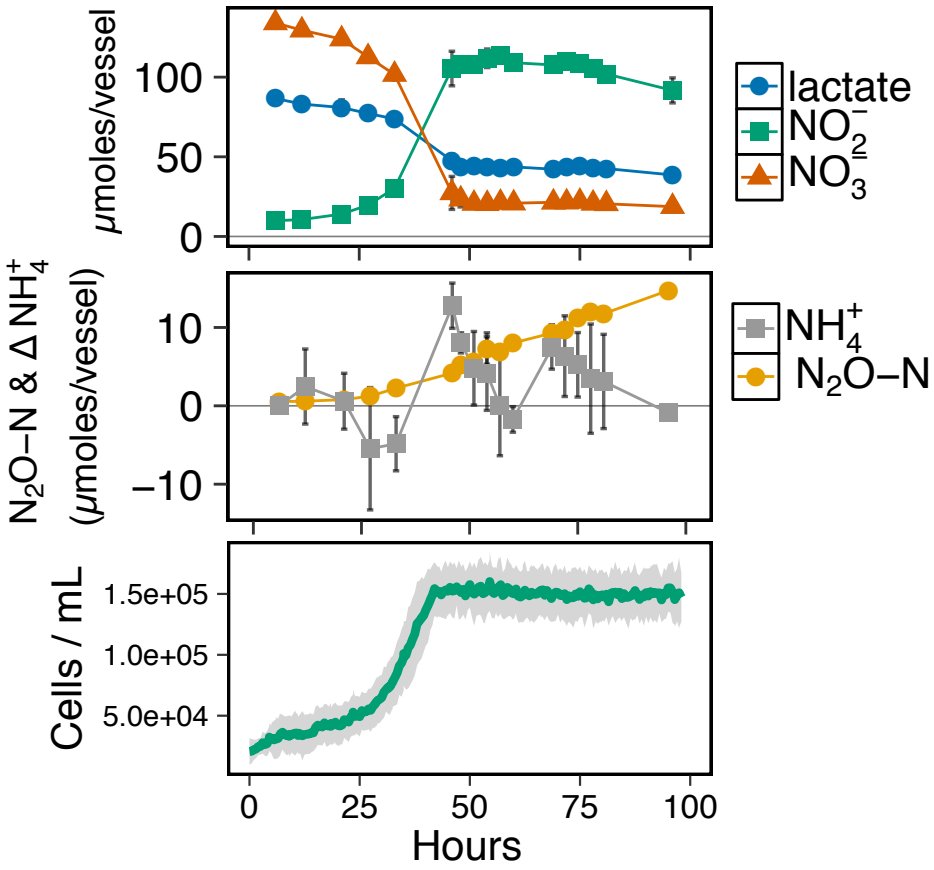

Figure S2. Time-series metabolite profiles of a 96-hour incubation for lactate, nitrate, and nitrite (top pane), production of dissimilated end-products as N_2O-N and net change in NH_4^+ ammonium production (middle pane), and corresponding growth curve of *I. calvum* cells grown under 0.8mM lactate 1.2mM nitrate ($C:NO_3^-$ ratio = 2) (bottom pane).

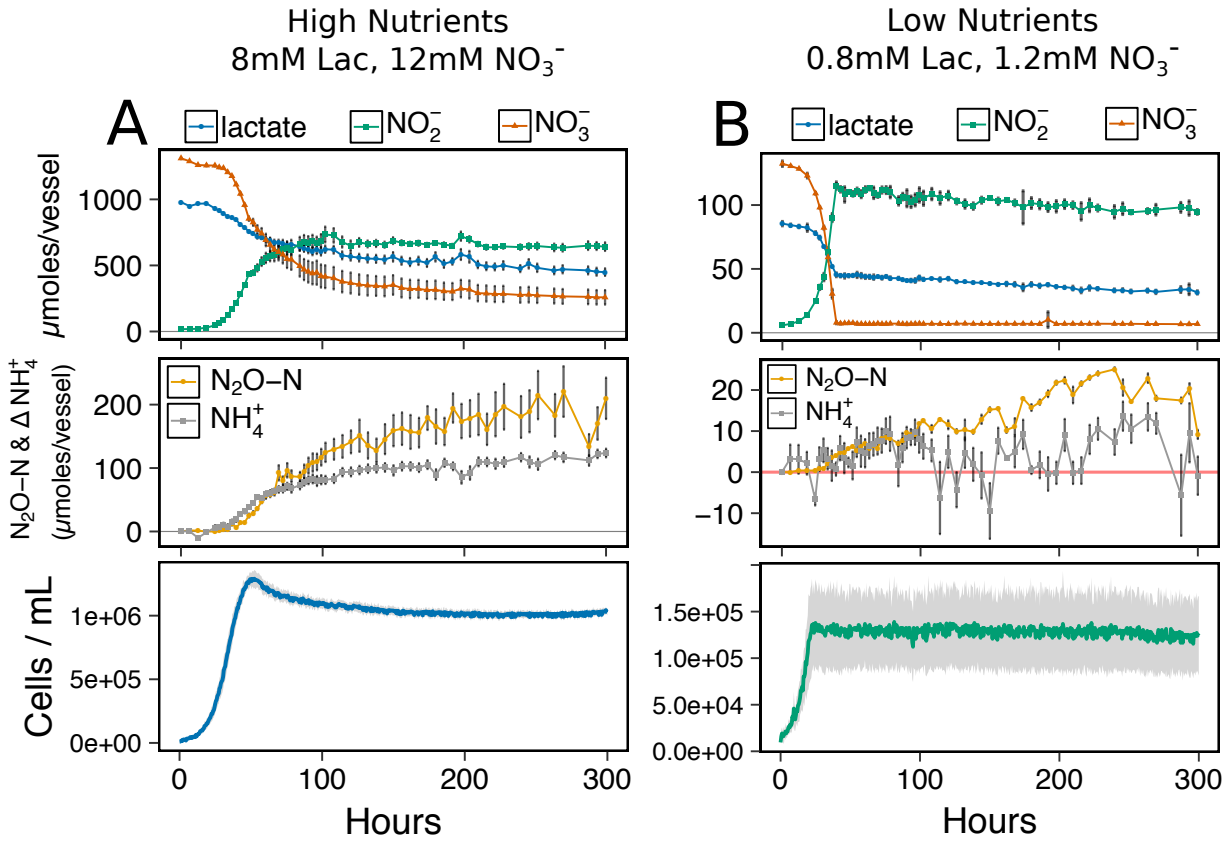

Figure S3. Time-series metabolite profiles of a 300-hour incubation for (A) high nutrient and (B) low nutrient concentrations. Shown are the profiles of lactate, nitrate, and nitrite (top pane), production of dissimilated end-products as N_2O-N and net change in NH_4^+ ammonium production (middle pane), and corresponding growth curves of *I. calvum* cells (C:NO_3^- ratio = 2) (bottom pane).

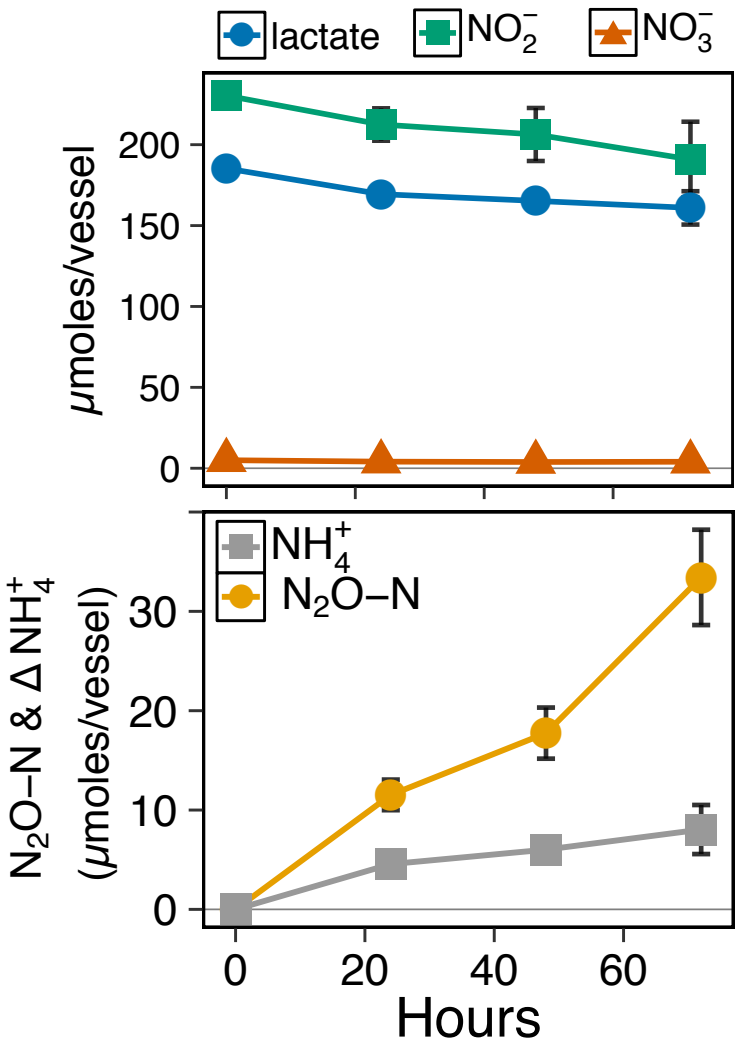

Figure S4. Time-series metabolite profiles of a 72-hour incubation conducted in balch-tubes grown under 8mM lactate 12mM nitrite (C:NO_2^- ratio = 2). Profiles for lactate and nitrite (top pane) and production of dissimilated end-products as N_2O-N and net change in NH_4^+ ammonium production (bottom pane).

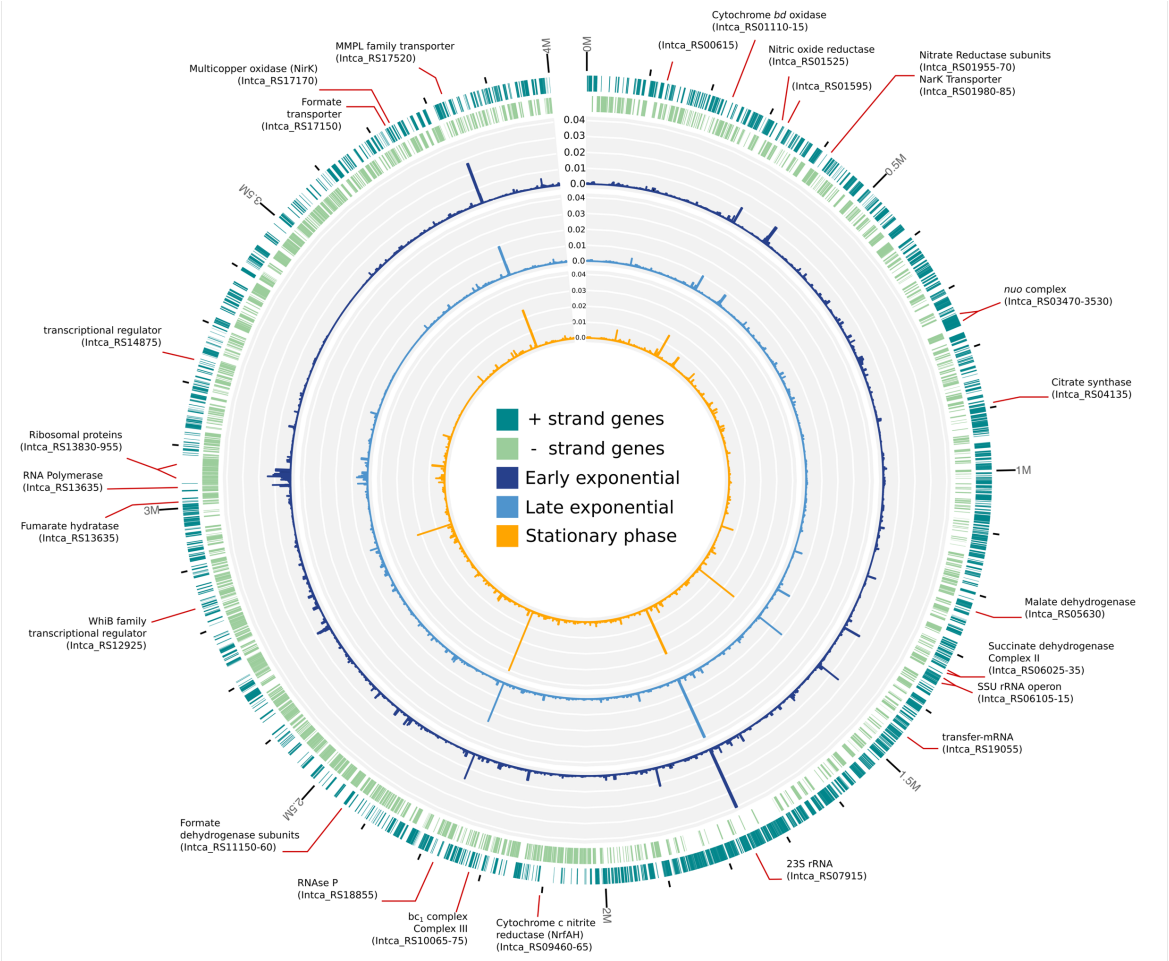

Figure S5. The genome-wide transcriptional changes of early exponential, late exponential, and stationary phase *I. calvum* cells. The first and second outermost rings (dark and light green indicate the open reading frames (ORFs) on the positive and negative strands. The third, fourth, and fifth rings are the relative abundance of transcripts mapped onto the *I. calvum* genome based on the transcript read counts from early exponential phase, late exponential phase and stationary phase, respectively. The position and locus IDs are marked for the most highly expressed genes and genes involved in the ETC.

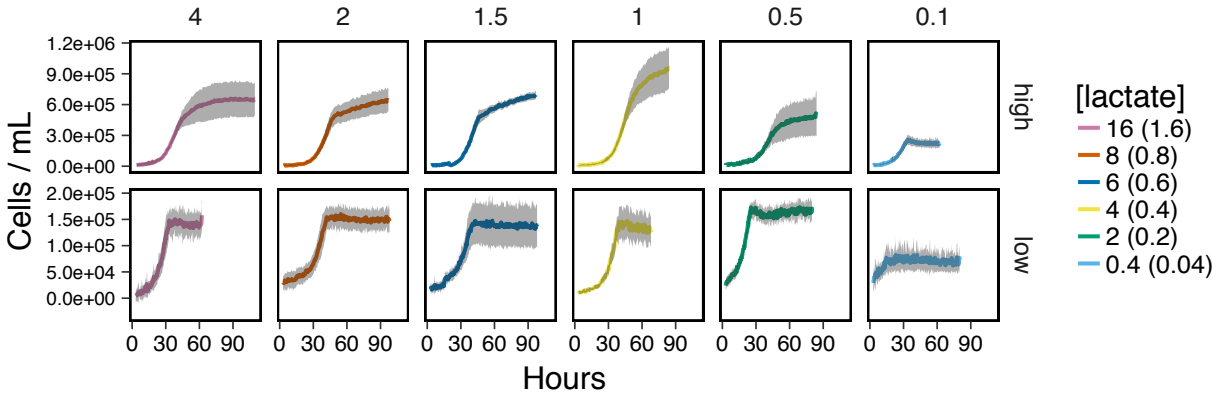

Figure S6. Mean cell concentrations for *I. calvum* cultures grown over a range of C:NO_3^- ratios (columns) at high nutrient (top row) and low nutrient (bottom row) concentrations of the same ratio. Each growth curve consists of n=6 replicates.

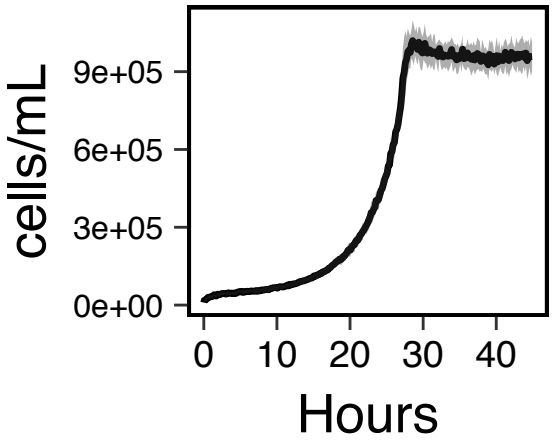

Figure S7. Growth curve of *I. calvum* in a sealed Balch-tube with lactate and O_2 as electron donor/acceptor pair and with ammonium as sole nitrogen source.

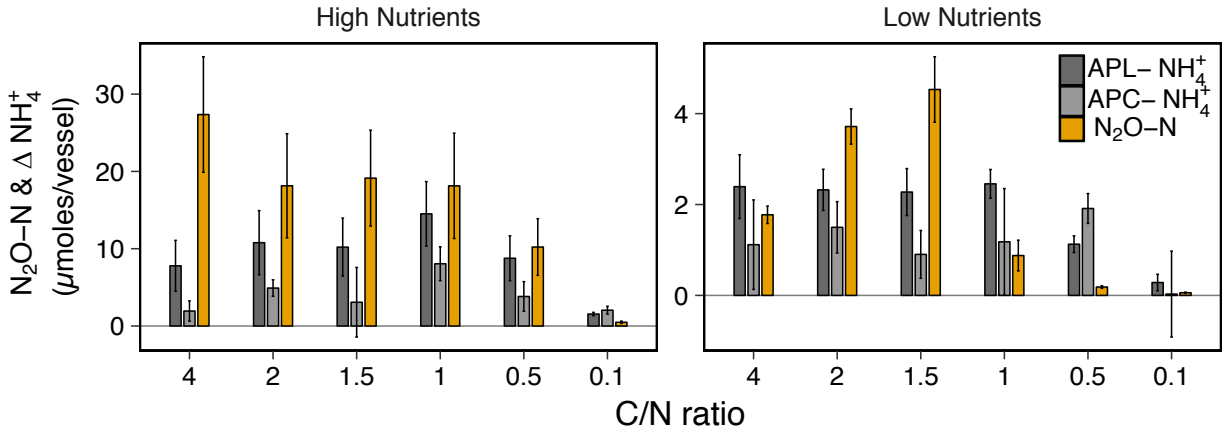

Figure S8. The effects of high nutrient (left) and low nutrient (right) concentrations with the same C:NO_3^- ratio on pathway selection in *I. calvum* C5. Bars represent the production of N_2O-N and the net change of NH_4^+ over a 100-hour incubation period at 30 ºC. Each bar represents the average of 8-10 replicates per treatment (Table S5). Description of calculation methods using ammonium consumption per lactate (APL) and ammonium consumption per cell (APC) are in *SI Materials and Methods*.